



Difference in awareness about glaucoma and cataract among students of health sciences and its determinants in western Saudi Arabia – A survey

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ABSTRACT

Purpose: To assess the magnitude and determinants of awareness about common eye diseases among citizens of Makkah. **Methods:** This cross-sectional survey of adult citizen of Makkah city was held from April to May 2020 in the city of Makkah. The participants' demography, social determinants and eye diseases status in the family were collected. The questionnaire had 24 questions. The sum of the responses on awareness was graded as positive or negative and correlated to determinants. **Results:** We surveyed 471 citizens. Of them, 287 (61%) were female. Their mean age was 28 ± 10 years. The median score of awareness was 1.0 (inter quartile range was 0.0; 3.0) (minimum -6.0 and maximum 9.0). The awareness of participants was positive in 298(63.1%; (95% Confidence Interval 58.9; 67.6)) and negative in 173 (36.9% (95% CI 32.4; 41.1)) participants. **Conclusions:** Awareness among citizens of the city of Makkah was positive in half of the participants. Further improvement in knowledge of adult citizens of Makkah through health education, by using modern tools as favored by adult citizen of Makkah is recommended.

Keywords: Eye diseases; awareness; Eye health education.

1. INTRODUCTION

It is estimated that there are 36 million blind and 217 million people with moderate and severe visual impairment worldwide. Although active intervention has resulted in the reduction of blindness prevalence, population growth and the increasing aging population will increase the number of persons with visual disabilities (Bourne et al., 2017). The risk of visual disabilities is likely to be more in rural areas as compared to urban areas mainly due to inaccessibility to services in developing countries (Shahdadi et al., 2018; Jolly et al., 2020). Saudi Arabia is a country of the Middle East (Asia) with a Gross Domestic Product (GDP) per capita of US \$ 21,395 in 2018 (Ministry of Health, 2018). The magnitude of visual disabilities in all ages in recent years is not available in Saudi Arabia. However, it was projected to be 0.7% for blindness and 6% for moderate and severe visual disability (AlGhamdi, 2019). Un-operated cataract, diabetic retinopathy, uncorrected refractive errors and glaucoma were the leading causes of visual disabilities in the Kingdom. Eye services of a high standard are available to the Saudi population free of cost. To further reduce visual disabilities, strategies other than increased accessibility should be addressed in the kingdom. Early detection and high uptake of management are keys to addressing blinding eye diseases and avoiding visual disabilities. Both, service providers and eye patients, are stakeholders in this initiative. Therefore, raising the awareness of the population about common and blinding eye diseases is vital.

The city of Makkah has a population of 2 million. There were 83 ophthalmologists and around 25 optometrists in 2017 providing eye care services. In 84 primary health centers (PHC) and 14 hospitals, eye patients were provided eye services. (Ministry of Health, 2018) To the best of our knowledge, primary eye care is not integrated into primary health care and health education campaigns for common eye disease prevention are not held in PHCs. Studies were undertaken about the awareness in the general population about common and blinding eye diseases in Riyadh and in the north-west region of Saudi Arabia (Al Rasheed et al., 2017; ALLahim et al., 2018). Although awareness about specific diseases like cataract and diabetic retinopathy has been studied, the studies focused on specific population groups (Magliyah et al., 2015; AlZahrani et al., 2018). To the best of our knowledge, no such community-based awareness study was held in the western region of Saudi Arabia.

We present the rate of awareness about common and blinding eye diseases and their determinants among the population of Makkah in 2020. We also present perceived current and preferred sources of information on eye diseases for the population.

2. METHODS

The ethical and research board of the Umm Al-Qura university institution approved of this web-based survey by ethical number (HAPO-02-K-012-2020-11-483). Tenets of the Helsinki declaration were followed in this survey. The survey was held in April and May 2020.

People aged 18 and older, residing in Makkah was invited to participate in this survey. Those physically ill or unable to communicate with field investigators were excluded from the study. To achieve 95% confidence and 5% acceptable error margin covering the 2 million population of Makkah with an assumed rate of awareness of 82.5%, a study design effect of 2 and 10% additional sample to cover for incomplete participation, we needed 486 participants (Al Rasheed et al., 2017). To calculate for a cross-sectional survey, we used sample size calculation software of Open epi (Dean et al., 2020). A close-ended questionnaire was pretested on ten participants as a pilot. The reverse translation from Arabic to English was carried out to ensure errors have not affected the investigation tool. The questionnaire was adopted from a previous study held in Riyadh (Al Rasheed et al., 2017).

The demographic information of participants included gender, age, occupation, literacy, social status, area of residence and nationality. History of eye disease in participant or his/her close relative was inquired. Information on systemic diseases like diabetes, hypertension, etc. was also obtained. Questions included data on previous eye medication or surgery. There were 24 questions to find out the level of awareness of different components of eye care. Five questions were on sunglasses and refractive error, four on contact lens usage, four questions about childhood eye diseases and five questions were about age related chronic eye diseases like diabetic retinopathy, glaucoma and cataract. Three questions were about standard methods of using eye medication and two questions each were on ocular injuries and routine eye screening. The participants responded with 'true', 'false' or 'I do not know' as the answer. For each question, the correct response was finalized based on 3 consultants' responses (Gold standard). For a correct answer of a participant, a score of 1 was awarded. For an incorrect answer, a score of -1 was allotted. For an 'I do not know' answer, a score of 0 was given. The awareness score of each participant was the sum of the score for 24 questions related to eye care. If it was from 1 to 24, we considered it as good awareness of eye disease. If it was 0 or less, we considered it as poor awareness.

We entered the data on Microsoft XL spread sheets. After checking for completeness and correcting for minor typographical errors, it was transferred into spreadsheets of Statistical Package for Social Studies (SPSS 26) (IBM, NY, USA). The total awareness score was presented as the median and inter quartile range. It was also grouped as good and poor awareness. The latter group was associated to the different determinants. For two subgroups, we calculated the Odds ratio, its 95% confidence interval and two sided P value. For 3 or more subgroups, we presented the chisquare value, degrees of freedom and two sided P value.

3. RESULTS

We surveyed 471 citizens. Their demographic profile is given in Table 1. Two-thirds of participants were females. Half of the participants were younger than 25 years of age. Around 5% were suffering from one or more eye diseases.

Table 1 Profile of Makkah citizen participating eye diseases awareness survey

		Number	Percentage
Gender	Male	184	39.1
	Female	287	60.9
Nationality	Saudi	392	83.2
	Non-Saudi	79	16.8
Marital status	Married	162	34.4
	Not married	298	63.3
	Widow/divorced	11	2.3
Education	School graduate	91	19.3
	College	380	80.7
Area of residence	Central	20	4.2
	North	1	0.2
	East	8	1.7
	West	415	88.1
	South	27	5.7
Occupation	Students	253	53.7
	Unemployed	117	24.8
	Employed	77	16.3
	Retired	19	4.0
	Business	5	1.3
Eye diseases	Yes	27	5.7
	No	434	92.2
	Don't know	10	2.1

The median score of awareness was 1.0 (inter quartile range was 0.0; 3.0) (minimum -6.0 and maximum 9.0). The awareness of participants was positive in 298 (63.1%; (95% Confidence Interval 58.9; 67.6)) and negative in 173 (36.9% (95% CI 32.4; 41.1)) participants.

There were seven subgroups of eye issues for which the awareness scores were obtained. The type of awareness in each of these subgroups' is given in Table 2. The awareness levels for issues related to contact lens and childhood diseases were poor compared to old age related eye diseases. Variation of awareness among subgroup of eye component was significant (Friedman $P < 0.001$)

Table 2 Subgroups of awareness regarding common and blinding eye diseases among residents of Makkah Saudi Arabia

Subgroup of awareness	Median	Inter Quartile range
Sunglass and refractive error	0.2	0.0; 0.4
Contact lens	-0.5	-0.5; -0.25
Childhood blindness	-0.5	-0.75; -0.25
Eye diseases in old age	0.4	0.2; 0.4
Eye medication usage	0.0	0.0; 0.5
Eye screening	0.0	0.0; 0.0
Eye injury	0.5	0.0; 1.0

The good and poor levels of awareness were associated to different variables (Table 3). None of the demographic and health related issues were significantly associated to the level of awareness about common and blinding eye diseases.

Table 3 Awareness about common and blinding eye diseases among citizen of Makkah and its determinants

		Good Awareness (N = 298)		Poor Awareness (N = 173)		Validation
Gender	Male	116	38.9	68	39.3	OR = 0.98
	Female	182	61.1	105	60.7	95% CI 0.7 ; 1.4 P = 0.9
Nationality	Saudi	250	83.9	142	82.1	OR = 1.14, 95% CI 0.7; 1.9 P = 0.6
	Non-Saudi	48	16.1	31	17.9	
Education	School	60	20.1	31	17.9	OR = 1.16, 95% CI 0.7; 1.9 P = 0.5
	College and higher	238	79.9	142	82.1	
Occupation	Student	155	52.0	98	56.6	$\chi^2 = 1$ df = 3, P = 0.3
	Working	77	25.8	40	23.1	
	Not working	51	17.1	26	15.0	
	Other	15	5.0	7	4.0	
Region	West	265	88.9	150	86.7	OR = 1.23, 95% CI 0.7; 2.1 P = 0.5
	Other	33	11.1	23	13.3	
Eye problem	Yes	21	7.0	16	9.2	OR = 0.75, 95% CI 0.4; 1.5 P = 0.4
	No	277	93.0	157	90.8	
Eye disease in relative	Yes	162	54.4	98	35.3	OR = 1.0, 95% CI 0.7; 1.5 P = 0.9
	No	99	33.2	61	8.1	
	Missing	37	12.4	14		
Age		28.2± 10.4		27.6 ± 9.4		P = 0.5

The sources of knowledge about eye ailments among the participants are given in Table 4. Internet (62%) and social media (17%) were the main sources of knowledge about common and blinding eye diseases among Makkah citizen.

Table 4 Sources of information about eye care and common and blinding eye diseases among Makkah residents

	Number	Percentage
Internet	268	56.9
Mass media	14	3.0
Social Media	61	13.0
Health staff	37	7.9
Educational campaign	24	5.1
Family & friends	85	18.0

The cataract and glaucoma knowledge scores for epidemiology, diagnosis and management subgroups are given in Figure 1. The variation of knowledge score among three subgroups of Cataract as well as of glaucoma regarding epidemiology, diagnosis and management was significant (Friedman p <0.001).

4. DISCUSSION

The survey of urban citizens of the western Saudi city suggested that the level of awareness about common and blinding eye diseases is reasonable among them, but it can be further improved. People were sufficiently aware about the age-related blinding eye diseases. However, awareness about contact lenses, childhood blindness and refractive error is poor to a large extent. Internet and social media were the main avenues for accessing knowledge for Makkah's citizens. Interaction with health staff could provide eye related knowledge to very few participants. Surprisingly, those having family members or relatives having an eye disease were not having significantly better awareness about eye diseases than those without relatives having an eye disease.

The level of awareness in our study was similar to that reported in the urban population of Riyadh, but was better than that reported by Al-Lahim et al. in the north-west of Saudi Arabia (Al Rasheed et al., 2017; AlLahim et al., 2018). The awareness was much better in our study when compared to the rural population of developing country, Nigeria (Onwubiko et al., 2015). One of the important tasks of primary eye care services is health promotion by preventing common and blinding eye diseases prevalent in the area (Mishra et al., 2015). Allergic eye diseases, keratoconus and hereditary eye diseases that are in high proportion in the Saudi

population require the population's cooperation in prevention, early detection and timely management of blinding eye diseases (Darraj et al., 2016; AlKuraya, 2010; Netto et al., 2018; Malik et al., 2018). Self-medication using steroid, especially for allergic eye diseases, is a trend that is common in the less aware population (Kadri et al., 2011). We could not find any association of demographic or other risk factors with lower awareness among study participants. This was in contrast to findings of the risks of poor awareness in Bangladesh's population (Eslam et al., 2015).

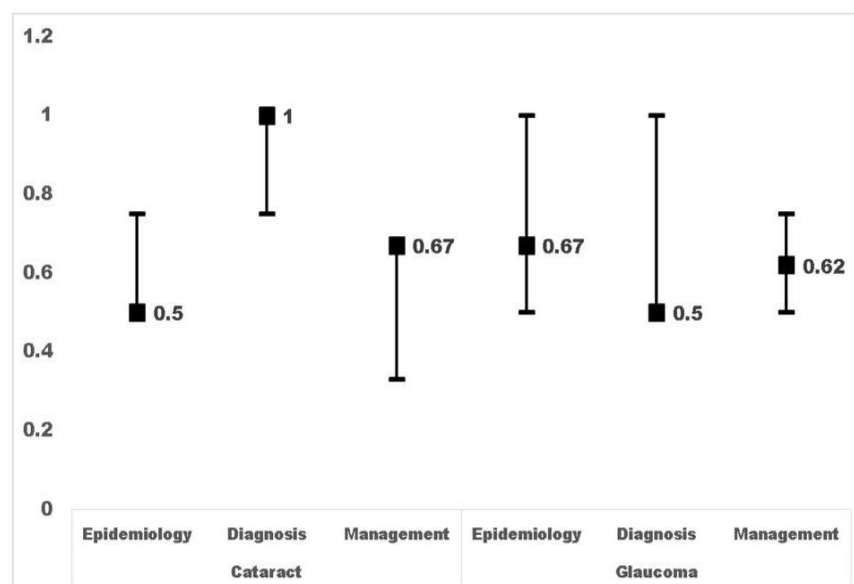


Figure 1 Cataract and glaucoma knowledge scores for epidemiology, diagnosis and management subgroups

Improving awareness through health promotion is a specialized task that needs the proper approach and training of existing health staff and community health workers (Fartman & Allensworth, 2016). With the good reach of social media, internet and the mass media, the study shows that these widely used media are ideal locations for educating the masses about eye care through (National Academies of Sciences, 2017; Fergie et al., 2016). However, they are more likely to be utilized by the young and educated population compared to those less educated, rural and underprivileged. Further local research could identify the most suitable strategy for health promotion related to eye care.

This study of cross-sectional nature has some inherent limitations. The temporal relationship of determinants and outcomes cannot be established. Thus, the question of whether the development of an eye disease in the family came first or the knowledge about that eye ailment came first was difficult to decide.

5. CONCLUSIONS

This study was done in the urban population of an industrialized country, but because Makkah is still a center for religious pilgrimage, the study is unique and it shows the rapidly evolving knowledge-seeking behavior for eye care. It showed a transition from conventional health institution-based knowledge transmission to mass media and social media-based knowledge seeking behavior. Awareness among citizens of Makkah was positive in more than half of participants. There is a need for further improving their knowledge through health education by using modern tools as favored by adult citizen of Makkah.

Funding

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Ethical approval

The study was approved by the Medical Ethics Committee of Umm Al-Qura university, Saudi Arabia (ethical approval code: (HAPO-02-K-012-2020-11-483)).

Contribution of authors

Dr. Abdullah Al-Ghamdi and Dr. Ashjan Yousef Bamahfouz was the main participant in writing study introduction, Methodology, discussion and organize the reference part as well as helped in data entry, and the statistical design and analysis.

Both of Saad Naif Saad Albagami, Salah Mohammed Taha Salah Bakry and Amr Ali Essa Almousa; were participated equally in designed the study, developed the questionnaire and the informed consent

Sulten Misfer Saeed Alzahrani, Mohammed Aziz Abdul Hamid Al Harby, Waleed Dhaifallah Abed Alnemari; were participated equally in planed the study as well as helped in data collection.

Data and materials availability:

All data associated with this study are present in the paper.

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